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Philadelphia College of Osteopathic Medicine Department of Psychology

THE RELATIONSHIP BETWEEN STRESS, SOCIAL PROBLEM SOLVING,
AND PSYCHOLOGICAL DISTRESS IN MOTHERS OF DAUGHTERS WITH
EATING DISORDERS

By Sarah M. Hittinger

Submitted in Partial Fulfillment of the Requirements of the Degree of Doctor of
Psychology May 2018

**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

Dissertation Approval

This is to certify that the thesis presented to us by Sarah Hittinger
on the 17 day of May, 2018, in partial fulfillment of the
requirements for the degree of Doctor of Psychology, has been examined and is
acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Chairperson

Chair, Department of Psychology

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Abstract

Mothers of daughters with eating disorders are at risk for experiencing high levels of psychological distress, which can have negative implications for mothers themselves and the children under their care. Coping strategies that effectively manage the stress of the caregiving role have been found to reduce psychological distress, but the literature does not clearly define the type of coping that is best indicated for this population of caregivers. Coping via social problem solving has been found to predict less psychological distress and moderate the stress-distress relationship in many caregiver populations. The relationship between stress, coping via social problem solving, and psychological distress was explored; it was hypothesized that stress related to being a mother of a daughter with an eating disorder and social problem solving would predict the level of experienced psychological distress, and that social problem-solving skills would moderate the stress-distress relationship. The present study was able to replicate the finding that mothers of daughters with eating disorders are highly distressed, and was unsuccessful at finding social problem-solving skills to predict psychological distress or moderate the relationship between stress and distress. Implications of these findings are discussed.

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I. Statement of the Problem

Eating disorders (EDs) are serious mental health disorders that affect millions of individuals and families (Dingemans et al., 2016; Le Grange, Swanson, Crow, & Merikangas, 2012). Family members often act as the primary caregivers for patients with EDs because a high percentage of individuals affected with eating disorders are adolescents and young adults (Micali, Hagberg, Petersen, & Treasure, 2013). These familial caregivers, referred to collectively as *carers* and *ED carers*, often assume active roles in their child's treatment and provide ongoing care and supervision (Steinhausen, 2009; Coomber & King, 2013). Similar to the experience of other types of familial caregivers, ED carers often report experiencing high levels of psychological distress as a result of their caregiving role (Coomber & King, 2013; Padierna et al., 2013). Maternal ED carers are particularly likely to experience high levels of psychological distress (Martin et al., 2015; Raenker et al., 2013; Padierna et al., 2013). Psychological distress is understood as a deviation from one's usual level of functioning as a result of a reaction to a stressful situation, such as caring for an ill child (Horwitz, 2007). Adults with significant psychological distress are at increased risk for serious mental and physical health problems, compared with adults without serious psychological distress (Weissman, Pratt, Miller, & Parker, 2015). In addition to potential consequences of psychological distress for carers, the children under their care can also be impacted by carers' experienced distress. Psychologically distressed carers may inadvertently respond to their individual child's ED in ways that increase the child's distress, which is associated with maintenance and exacerbation of that child's ED symptoms (Treasure & Schmidt, 2013; Goddard et al., 2013; Schmidt & Treasure, 2006). Decreasing carers' level of distress is associated with better outcomes for both carers and the individuals

with EDs under their care (Kyriacou, Treasure, & Schmidt, 2008; Treasure & Schmidt, 2013; Goddard et al., 2013).

The factors that are most consistency identified in the research as being associated with ED carers' experienced psychological distress include stress that is specifically related being an ED carer, general life stress that is not specific to being an ED carer, and carers' ineffective or absent efforts to cope with their experienced stress (Padierna et al., 2013; Slater, Treasure, Schmidt, Gilchrist, & Wade, 2014; Whitney, Haigh, Wienman, & Treasure, 2007; Raenker et al., 2013). It has been found that less psychological distress is associated with the use of coping efforts that effectively manage the demands of the caregiving role, even among carers who experience significant levels of stress (Zendjidian & Boyer, 2014; Coomber & King, 2012; Raenker et al., 2013). Given the fact that many ED carers experience psychological distress related to their caregiving role, and that carer distress can impact both the carer and the children under their care, it is becoming increasingly evident that carers could benefit from interventions that help decrease their experienced psychological distress. Recently, interventions have been developed that have focused on decreasing ED carers' psychological distress in different ways, many of which focus on improving carers' coping abilities and efforts (Hibbs, Rhind, Leppanen, & Treasure, 2015; Treasure et al., 2008). Although the research suggests the need to manage the demands of being an ED carer via coping efforts, the literature generally does not address how carers can systematically, idiosyncratically, and successfully do so (Treasure & Nazar, 2016). More information is needed about the relationship between specific types of coping and psychological distress in ED carers in order to better inform interventions to decrease psychological distress in this important caregiver population.

II. Purpose of the Study

The purpose of the current study was to investigate the relationship between stress, coping efforts, and psychological distress in female carers of children with eating disorders (*ED carers* and *maternal ED carers*). It aimed to examine the relationship between a specific type of coping, *social problem solving*, and psychological distress in a sample of lay caregivers of female children with eating disorders. The present study examined the relationship between the stress of being an ED carer and the outcome of psychological distress, and explored whether or not coping via social problem solving moderates the relationship between stress and psychological distress. The purpose of the present study was to contribute to a better understanding of the factors that influence psychological distress in this carer population and if improving social problem-solving skills might be a useful treatment target in interventions that aim to decrease psychological distress for these individuals.

III. Literature Review

Eating Disorders

Eating disorders (EDs) are mental health disorders marked by functional and psychological impairments and increased risk for serious physical and mental health consequences, including mortality and suicide (Dingemans et al., 2016; Fichter & Quadflieg, 2016; Smink, van Hoeken, & Hoek, 2012; Arcelus et al, 2011; Keel & Brown, 2010). Anorexia nervosa (AN) and bulimia nervosa (BN) are the two most frequently studied eating disorder (ED) diagnoses classified in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*; American Psychiatric Association, 2013). Individuals with AN and BN both engage in strict dietary restraint as a way to control their weight, and both may engage in episodes of binge eating and compensatory weight control behaviors, such as vomiting or laxative abuse. The primary difference between AN and BN relates to the balance of the undereating and overeating and its effects on body weight (Fairburn, 2008); only the diagnosis of AN requires the individual be classified as underweight.

Despite the different behavioral manifestations of AN and BN, it is thought that people with AN and BN experience similar levels of health risk, functional impairment, psychiatric comorbidity, and psychological distress (Dingemans et al., 2016; Arcelus et al, 2011; Crow et al., 2009; Stice, Rohde, Durant, & Shaw, 2012; Thomas, Vartanian, & Brownell, 2009). Longitudinally, migration between the ED diagnoses is considered “the norm rather than the exception” (Fairburn, Cooper, & Shafran, 2003). The disorders are marked by periods of remission and recurrent relapses and are often considered chronic because a large proportion of those with an ED suffer from these disorders for nearly a decade or more (Fairburn, 2008; Kordy et al., 2002; Coomber & King, 2013; Stoving et al., 2011; Keel & Brown, 2010).

It is proposed that eating disorders are maintained by the individual's overvaluation of weight and shape and by the subsequent attitudes and behaviors, including body dissatisfaction, non-compensatory weight control behaviors (e.g., strict dieting), and compensatory weight control behaviors (e.g., vomiting) (Fairburn, 2008). Within the ED population, this overvaluation of shape and weight is shared among males and females, adolescents and adults, and is found across full and sub-threshold AN and BN diagnoses. Although integral among all EDs, this dysfunctional framework for self-valuation is not common in the general population, and it is different from body shape dissatisfaction. Body shape dissatisfaction is considered widespread and falls within the bounds of "normative dissatisfaction" (Fairburn, 2008).

It is currently estimated that at least 30 million individuals in the United States will suffer from a clinically significant eating disorder during his or her lifetime (Hudson, Hiripi, Pope, & Kessler, 2007; Le Grange, Swanson, Crow, & Merikangas, 2012). In the United States, the lifetime prevalence for AN and BN in the adult female population is estimated to be 0.9% and 1.5%, respectively (Hudson et al., 2007). The specific prevalence of eating disorders among women of color is not certain, but it is thought that the prevalence of eating disorders in the United States is similar among individuals who identify as Non-Hispanic White, Hispanic, African-American, and Asian, with the exception that AN is more common among Non-Hispanic White individuals (Hudson et al., 2007; Wade, Keski-Rahkonen, & Hudson, 2011; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). It is estimated that males have a lifetime prevalence of 0.3% for AN and 0.5% for BN (Wade et al., 2011; Hudson et al., 2007).

Eating disorders primarily affect young people. Approximately 95% of those who have eating disorders are between the ages of 12 and 26, with typical onset between 12 and 20 years of age (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011; Stice, South, & Shaw,

2012; Hudson et al., 2007). Although the lifetime prevalence rates for AN and BN in adult men and women is estimated to be around 1%, it is reported to be 2.7% in adolescents, ages 13-18 (Merikangas et al., 2010). It is thought that upwards of 13% of adolescent girls and women currently meet the diagnostic criteria for full and sub-threshold ED diagnoses (Stice, Marti, & Rohde, 2013). The sequelae of eating disorders often include a negative impact on the family of the person with the ED, making the number of individuals affected by these disorders even greater (Micali, Hagberg, Petersen, & Treasure, 2013; Sepulveda, Whitney, Hankins, & Treasure, 2008; Whitney, Murray, Gavan, Todd, Whitaker, & Treasure, 2005).

Given the seriousness of these disorders and the likelihood that the patient will have frequent and ongoing contact with family members due to the relatively young age of onset and chronic nature of the disorder, it is important to understand the experience of the family members who help provide care to individuals with EDs.

Stress and Psychological Distress in Caregivers

Familial caregivers, referred to collectively as *carers*, are individuals who provide physical and/or emotional care to a relative with a disability or physical or mental illness (Angulo, Wagner, Hill, Hunt, & Whiting, 2017). Due to the physical and emotional demands associated with caring for a sick family member, carers frequently experience increased stress related to their caregiver role (Martin et al., 2015; Raenker et al., 2013; Graap et al., 2008; Padierna et al., 2013; Kung, 2003).

Stress can be understood as a physiological response to a stressor (Selye, 1956, as cited in Matthieu & Ivanoff, 2006). A *stressor* is as any real or imagined situation or stimulus that initiates a physiological stress response (Everly & Lating, 2012). The two type of stressors that occur are *biogenic* and *psychosocial*. *Biogenic stressors* lead to a physiological stress response

when the body reacts to a stimulus, such as a substance or environmental factors (Everly & Lating, 2012). *Psychosocial stressors* involve an individual's interpretation of the situation or stimulus. Psychosocial stressors are interpreted along a continuum that ranges from no perceived harm to negatively affecting one's well-being (Lazarus & Folkman, 1984). A situation or stimulus becomes a psychosocial stressor when an individual has a physiological stress response based on the interpretation that the situation is threatening to his or her well-being (Everly & Lating, 2012).

According to the widely accepted and studied transactional model of stress (Lazarus, 1999; Lazarus & Folkman, 1984), the physiological stress response is thought to result from an individual's cognitive appraisal of both the situation itself and of his or her available resources to manage the demands of the situation. That is, a physiological stress reaction occurs when someone appraises a situation as threatening to his or her well-being, and as requiring more resources to manage the demands of the situation than are available (Lazarus and Folkman, 1984). This process of one's appraisal of a situation or stimulus leading to the stress response is the essential component of understanding stress in this transactional model.

If the physiological stress response is not effectively managed, it may result in the onset of psychological distress (Selye, 1956). *Psychological distress* can be defined as a deviation from one's usual level of functioning, and is typically measured by the emergence of mental health disorders and symptomatology, degree of social impairment, and the presence of somatic symptoms (Horwitz, 2007). It is widely accepted that stressful situations or circumstances (e.g., being an ED carer) lead to psychological distress through an unmanaged physiological stress response (Selye, 1956). The physiological stress responses can lead to psychological distress if the person does not engage in effective coping efforts, which are the cognitive and behavioral

efforts aimed at controlling the demands of the stressor (Ridner, 2004; Lazarus, 1999; Lazarus & Folkman, 1984). People implement coping strategies in one of two ways, problem-focused coping and emotion-focused coping. *Problem-focused coping* involves attempts to remove or reduce the stress and/or the cause of a stressor; *emotion-focused coping* involves efforts to reduce the negative emotional responses to the stress and stressor (Lazarus & Folkman, 1984). Lazarus and Folkman's transactional model of stress (1984) posits that coping efforts mediate, or explain, the relationship between stress and experienced psychological distress; stress leads to distress when coping efforts are absent or ineffective.

It has been well supported in the research on caregiver outcomes that the stress of being a carer can lead to psychological distress, mental health symptoms and disorders, and negative biological changes (Martin et al, 2015; Padierna et al, 2013; Chou et al., 2010; Slater et al., 2014; Coomber & King, 2012; Vitaliano et al., 2011). In carers, the outcome of psychological distress can be understood as resulting from an interaction between the carer's appraisal of the caregiving role, appraisal of his or her ability to manage the demands of the situation, and carer's coping efforts. If, as a result of the appraisal, a person determines that the situation is both threatening to his or her well-being and beyond his or her ability to cope, then the person will experience a physiological stress response. If efforts to cope with this stress response are absent or ineffective, then psychological distress is experienced.

Caring for a Child with an Eating Disorder

Similar to the experience of other types of familial caregivers, ED carers often report experiencing high levels of psychological distress as a result of their caregiving role (Coomber & King, 2013; Padierna et al., 2013). Psychologically distressed ED carers may inadvertently respond to their child's illness in ways that increase their child's distress, which is associated

with maintenance and exacerbation of that child's ED symptoms (Treasure & Schmidt, 2013; Goddard et al., 2012; Goddard et al., 2013). Decreasing carers' levels of distress is associated with better outcomes for both carers and the individuals with an ED under their care (Kyriacou, Treasure, & Schmidt, 2008; Treasure & Schmidt, 2013; Goddard et al., 2013).

Eating disorders have a profound impact on family members because the age of onset is usually before the individual has left home (Micali, Hagberg, Petersen, & Treasure, 2013). Family members are often the main caregivers for patients with EDs, assuming active roles in their child's treatment and provide ongoing care and supervision (Steinhausen, 2009; Coomber & King, 2013). Given the typical early age of onset and the often long duration of the illness, many individuals with EDs experience interruptions of important developmental milestones and many remain dependent on their families or government disability resources during their lifetimes (Hjern, Lindberg, & Lindblad, 2006; Kessler et al., 2014). Family members are frequently relied upon to provide emotional and financial support to their children with EDs because many mental and physical health problems arise with the chronic nature of eating disorders (Treasure & Nazer, 2016).

In many carer populations, female carers, especially mothers, are particularly likely to experience psychological distress as a result of the caregiving role (Caputo et al., 2016). This has also been found among ED carers (Martin et al., 2015; Raenker et al., 2013; Sepulveda et al., 2012). Compared with fathers, mothers may be in closer contact with their children, have greater involvement in practical care roles and treatment, may provide more of a supervisory role, are usually more involved during meal times, and they are often responsible for most of the patient's care (Martin et al., 2015; Martin et al., 2011; Graap et al., 2008; Kyriacou, Treasure, & Raenker,

2010). They may also feel more responsible for the disorder or more affected by relapses and crises (Graap et al., 2008).

Much of the research on ED carers has focused on the experience of mothers of daughters with AN and BN, and therefore more is known about the experiences of female carers of female children. Although the dysfunctional framework of self-valuation that is thought to maintain eating disorders is shared among males and females, far less is known about carers of male children with eating disorders. Because there are potential differences between caring for a male child and female child with an ED that may make the carer experience quite different, the present study focused only on carers of daughters. It is thought that females with clinically significant AN or BN experience similar levels of distress and impairment; thus, it is likely that carers of children with clinically significant AN and BN experience similar levels of challenges as a result of their caregiving roles. For this reason, it is reasonable to assume that mothers of daughters with clinically significant AN and BN have similar experiences as carers and can be examined as a group. Because female carers are particularly vulnerable to experiencing distress, and because more information exists about factors that contribute to distress in maternal ED carers, the present study aimed to expand the existing knowledge about how to help this population of maternal ED carers.

Favorable Outcomes in ED Carers

Not all carers experience distress or negative outcomes as a result of their caregiving roles (Schulz & Sherwood, 2008). It is possible for caregivers to experience both psychological distress and positive experiences, such as satisfaction and growth (Lawton, Moss, Kleban, Glicksman, & Rovine, 1991).

Selye's (1956) stress model recognized that stress can be helpful at times and that people have the potential for stressors to be beneficial as well as harmful. Selye understood stress as having the potential to lead to positive outcomes, such as increased performance and well-being, in addition to negative outcomes, such as distress. In this model, under the right circumstances and at an optimal level, which is different for everyone, stress can enhance one's performance and sense of well-being (Everly & Lating, 2012). When stress is over the ideal level for producing a positive outcome, then the potential for distress arises (Everly & Lating, 2012; Selye, 1956). Within the context of the transactional model of stress (Lazarus, 1999; Lazarus & Folkman, 1984), individuals are thought not to experience distress if they appraise the situation as not threatening or as manageable with their available resources, or if they effectively manage the effects of the physiological stress response via coping.

The abovementioned stress models (Lazarus & Folkman, 1984; Selye's 1956) explain the process of stressors leading to both positive and to negative outcomes in individuals. The ABCX Model (Hill, 1949, 1958) is useful in understanding reactions to stressors within a family system. In this model, factor *A* refers to the stressor. A stressor is understood as a life event or change that either produces or can potentially produce a change in the functioning of a family system. Factor *B* is a family's capabilities and resources. This factor can be understood as a family's ability to prevent a stressor from leading to a crisis and can include two facets: family cohesion and family's capacity to overcome obstacles (Burr, 1973, as cited in Brown-Baatjies, Fouché, & Greeff, 2008). Hill (1958) referred to these resources as "crisis-meeting resources" (as cited in Brown-Baatjies, Fouché, & Greeff, 2008). He described families as either adequately or inadequately organized in relation to the presence or absence of these family resources, suggesting that inadequately organized families are more likely to be vulnerable to stressors

leading to crises. Factor *C* is a family's definition of the stressor. The definition is influenced by the family's perception of the stressor itself and also family members' perceptions of their ability to meet the demands of the stressor. Stress is understood to arise when a family perceives the stressor as unpleasant and there is an objective or perceived imbalance between the required and available resources to cope with the demands of the stressor. When stress is not managed, a family is prone to experience a crisis. The *X* factor is a family crisis. Family stress is the result of actual or perceived imbalance between the demands and available coping resources of a family, but a family crisis results from the family's inability to restore stability after a stressor. A crisis arises when there is a deficit in family resources (factor *B*) and when there is a tendency to define stressors as crisis-producing and negative (factor *C*) (Hill, 1958).

Although some families experience a crisis in a response to a stressor, other families do not. Adjustment to the crisis is the favorable outcome for families who have encountered a stressor. This can be understood as largely resulting from adjustment and reorganization of roles and functioning within a family after a stressor occurs. Hill (1958) identified several factors that are related to adjustment to crises, including adaptability, family integration or cohesion, affectionate relationships between family members, good marital adjustment of both partners, pleasant relationships between parents and children, and past successful experience with crises.

The ABCX model explains the outcome of distress similarly to the models of stress set forth by Selye (1956) and Lazarus & Folkman (1984). This model understands the pathway to psychological distress as beginning when a person determines a stressor to be threatening to his or her wellbeing and also beyond his or her ability to cope, resulting in the experience of a physiological stress response, and leading to psychological distress if efforts to cope with this stress response are absent or ineffective. The ABCX model helps to understand how this process

of stress leading to psychological distress can occur within a family system. The model illustrates the role of a family's perception of a stressor and their ability to cope with the stressor, and how efforts to cope and reorganize the family system can result in either a negative outcome (crisis) or favorable outcome (adjustment). The ABCX model (Hill, 1958), the stress model (Selye, 1956), and the transactional stress model (Lazarus & Folkman, 1984) can help explain the reason why some families and family members have favorable outcomes as carers and others experience psychological distress.

Factors that Influence ED Carers' Experienced Psychological Distress

The literature has not thoroughly explained the reasons why ED carers who encounter similar circumstances related to caring for a child with a clinically significant ED may experience different levels of psychological distress. Knowing what may contribute to increased and decreased psychological distress in this particular population of carers is important, both for the wellbeing of the carer and their children, because carer distress is associated with distress in the child under their care. Some factors have been consistently identified as contributing to risk and to the experience of psychological distress in ED carers. In the present study, factors associated with ED carer distress will be categorized into three categories: 1) general life stress factors; 2) ED-carer-specific stress factors; and 3) coping efforts.

General Life Stress. General life stress factors can be understood as variables that contribute to carers' perceived or objective level of stress, but that are not specifically related to being a carer. These include demographic and social factors, as well as life events. Demographic and social variables that are associated with increased distress and that have been consistently identified in the ED carer literature include being divorced, having a low level of education,

having poor social support, and having high levels of depression or anxiety (Padierna et al., 2013; Slater et al., 2014; Whitney et al., 2007; Raenker et al, 2013).

ED-Carer-Specific Stress. ED carers have been found to experience similar levels of psychological distress as carers who provide care to family members diagnosed with disorders such as psychosis, dementia, schizophrenia, and other serious mental illnesses (Martin et al., 2015; Graap et al., 2008; Treasure et al., 2001). ED carers may experience factors associated with carer distress that are similar to other carer populations, such as worry and the challenge of balancing the role of caregiver with other personal responsibilities. ED carers are also exposed to unique factors related to caring for a child with an ED that can influence their experienced psychological distress.

Factors of stress specific to ED carers named in the literature often relate to the high dependency of the child on the carer due to patient age and seriousness and chronicity of the disorder. Specifically, EDs often persist over long periods of time; they usually present with multiple comorbidities and health risks, frequently require ongoing treatment, and can include multiple hospitalizations (Martin et al., 2011; Treasure, 2010; Raenker, 2013; Whitney et al., 2007). Additional factors include many hours of contact with the child each week (Martin et al., 2011; Whitney et al., 2007), struggles at mealtimes (Martin et al., 2011), experienced stigma about EDs (Whitney et al., 2007), lack of information about the disorders (Treasure et al, 2007), lack of practical support (Raenker, 2013), having many unmet needs (Haigh & Treasure, 2003; Winn), and misunderstandings about the disorders that result in blaming oneself or the child for the ED (Sepulveda, Whitney, Hankins, & Treasure, 2008; Whitney et al., 2007; Whitney & Eisler, 2005; Whitney et al., 2005).

The abovementioned demographic/social factors and ED-carer-specific factors are often labeled in the research as factors of *objective* and *subjective stress* or burden. This means that they are factors that contribute to the actual or perceived stress of being an ED carer. In the present study, these factors are referred to as *general life stress* and *ED-carer-specific stress*. These factors are important to consider when attempting to understand individuals' experiences of being an ED carer. However, research suggests that the effect of objective and subjective stress can be buffered by another important variable—effective coping efforts (Treasure & Nazar, 2016; Coomber & King, 2012; Raenker et al., 2013; Harmell, Chattillion, Roepke, & Mausbach, 2011).

Coping efforts. A consistent finding in the research is that carers who do not effectively cope with the stress of being an ED carer experience more psychological distress (Zendjijjian & Boyer, 2014; Coomber & King, 2012; Fortune, Smith, & Garvey, 2005). *Coping efforts* are the cognitive and behavioral efforts aimed at controlling the demands of a stressful situation (e.g., being an ED carer) (Lazarus, 1999; Lazarus & Folkman, 1984). Coping efforts are considered maladaptive when they are not helpful in managing the stress or they make the stress worse. The outcomes of absent, ineffective, and maladaptive coping are often measured as experienced psychological distress.

Research suggests that coping explains the relationship between carers' level of stress and experienced psychological distress (Coomber & King, 2012), suggesting that the effects of stress on the carer can be decreased by effectively coping with the demands of the caregiving role. Caring for a child with an ED is stressful to most carers, but the coping of each carer is different. These differences in coping lead to differences in the consequences associated with

being a carer (e.g., psychological distress) (Hibbs, Rhind, Leppanen, & Treasure 2015; Treasure & Nazar, 2016; Losada et al., 2006).

Coping with Carer Stress

Among ED carers, coping efforts have been implicated as a predictor of carers' experienced psychological distress, with maladaptive coping being associated with higher levels of distress than adaptive coping (Coomber & King, 2013; Coomber & King, 2012; Treasure et al., 2008; Whitney et al., 2007). The concepts of adaptive and maladaptive coping have been inconsistently defined in the ED carer literature. Although the research suggests the need to manage the demands of being an ED carer via coping efforts, it generally does not address how carers can idiosyncratically and successfully do so. Without a clear understanding of how to cope with the stress of being an ED carer, it is difficult to make the findings about the role of coping and distress clinically relevant to this carer population. Viewing coping within the context of a well-defined model of stress and coping is useful in order to develop a better understanding of how to help carers decrease their psychological distress.

The well-supported transactional model of stress developed by Lazarus and Folkman (1984) posits that coping efforts mediate, or explain, the relationship between stress and experienced psychological distress, that is, stress leads to distress when coping efforts are absent or ineffective. The *Social Problem Solving Model* (D'Zurilla, Nezu, & Maydeu-Olivares, 2002) expands on this stress and coping theory. The Social Problem Solving Model is a well-researched, complex model of how people cope with stressful situations and problems. This model has been widely used when studying distress in many carer populations. It is a useful framework for better understanding coping in ED carers and could identify concrete variables that might influence psychological distress in ED carers.

Coping Via Social Problem Solving

Social problem solving (SPS) is a process people use to cope with acute and chronic stressful situations or circumstances. It is considered a type of “real-life” problem solving because it occurs within an interpersonal and/or social context and relates to solving problems in everyday life. The process of SPS involves changing the nature of the situation so that it is no longer problematic, changing maladaptive responses to the problem, or changing both (D’Zurilla, Nezu, & Maydeu-Olivares, 2002).

A *problem* is a present or anticipated life situation that requires an adaptive response to prevent negative consequences, when a response is not immediately obvious or available. A problem can be understood as a person-environment interaction that results in a real or perceived discrepancy between the demands of the stressful situation and one’s ability to cope with the demands. Problems are fluid because they depend on factors relating to the person experiencing the situation and/or the environment. That is, a problem for one person might not be a problem for another person, and a problem for one person at one time-point might not be a problem for the same person at another point in time (D’Zurilla, Nezu, & Maydeu-Olivares, 2002; Nezu, Nezu, & D’Zurilla, 2012).

A *solution* is a coping response that is specific to a problem situation. A solution is considered effective if it achieves the problem-solving goal. Problem solving goals are either problem-focused and relate to changing the situation, or emotion-focused and involve changing one’s reaction to the problem. In any given problem situation, a person can have either type of goal, or both goals (D’Zurilla, Nezu, & Maydeu-Olivares, 2002). Problem solving refers to the process of finding solutions to specific problems, and solution implementation is the process of applying those solutions in the actual situation. Although both sets of skills are important for

effectively solving problems, problem-solving skills and solution implementation skills are not necessarily correlated, and a person might have deficits in either or both areas of problem solving (Nezu, Nezu, & D'Zurilla, 2012; D'Zurilla, Nezu, & Maydeu-Olivares, 2002).

In the current Social Problem Solving Model, SPS is conceptualized as the “multidimensional meta-process of ideographically identifying and selecting a set of coping responses to carry out in order to effectively address the particular (and potentially unique) features of a given stressful situation” (Nezu, Nezu, & D'Zurilla, 2012 p. 8). SPS, then, is not simply a singular type of coping behavior or effort. It is a method of identifying coping efforts, which is strongly influenced by factors of the problem solver and his or her unique situation.

Attempts at coping with problems are thought to be influenced by two factors: one's Problem Orientation and one's Problem Solving Style (D'Zurilla, Nezu, & Maydeu-Olivares, 2002; Nezu, Nezu, & D'Zurilla, 2012). A *Problem Orientation* is a relatively stable way of viewing problems and of one's ability to cope with them. Problem orientations represent patterns in attitude and beliefs, and are classified as either positive or negative. Individuals with a *Positive Problem Orientation (PPO)* tend to be optimistic about problems. They have a tendency to view problems as challenges that are solvable, believe in their ability to cope with problems, have realistic understandings of the time and effort that is involved in solving problems, and understand negative emotional reactions as a normal part of the problem solving process. People with a *Negative Problem Orientation (NPO)* are less optimistic about problems and their problem-solving abilities. They tend to view problems as threatening and unsolvable, doubt their ability to cope with problems, and become frustrated when dealing with problems or negative emotions.

Problem Solving Style refers to the cognitive and/or overt behavioral activities one uses while attempting to solve a problem. The SPS model identifies three problem solving styles. Rational Problem Solving is considered the effective or adaptive problem solving style, and impulsive/Careless Style and Avoidant Problem Solving are considered maladaptive problem solving styles (D'Zurilla, Nezu, & Maydeu-Olivares, 2002).

Rational Problem Solving is the planned, systematic application of applying specific skills when attempting to cope with problems. The skills involved in rational problem solving include defining the problem, identifying problem goals and potential barriers to reaching a solution, generating a variety of potential solutions to the problem, analyzing the feasibility and likelihood of success for the potential solutions, implementing the solution, and evaluating the outcome. This process can be repeated until one's goals are reached and the situation is no longer problematic. In contrast to the adaptive style of coping, the two maladaptive styles result in ineffective management of the problem and potentially making the problem worse. Individuals who use an *Avoidant Style* tend to resist dealing with problems. Those with an avoidant style may delay attempting to solve problems or put the onus of solving the problem on someone else. An *Impulsive/Careless* approach to problem solving involves using impulsive, unsystematic, or incomplete attempts at solving problems (D'Zurilla, Nezu, & Maydeu-Olivares, 2002).

Problem Solving and Psychological Distress in Carers

Ineffective social problem solving can make someone vulnerable to experiencing a variety of mental health disorders, and can also maintain psychopathology and problems (Nezu, Wilkins, & Nezu, 2004). In carer populations, social problem solving has been shown to be a significant predictor of psychological distress as well as a moderator of the relationship between stress and distress (Nezu et al., 2008). Specifically, poor and ineffective problem solving has

been implicated as a strong predictor of psychological distress in carers. More specifically, Negative Problem Orientation and avoidant and impulsive/careless problem-solving styles have been identified as predictors of psychological distress in caregivers of family members with serious medical illnesses and injuries, beyond other demographic variables or variables related to the severity or prognosis of the care recipient (Blucker et al., 2011; Elliott, Shewchuk, & Richards, 2001; Rivera et al., 2007; Elliott & Shewchuk, 2003).

In a review of the literature, no studies were found that investigate the relationship between SPS and psychological distress in ED carers. ED carers often experience stress related to their caregiving role, and the research suggests the importance of coping with this stress in order to lessen the carers' experienced psychological distress. However, "coping" is often unclearly defined in the ED carer literature, making it unclear what specific skills are effective in managing stress. It is important to gain a better understanding of what is helpful and unhelpful for ED carers. By examining ED carer coping within the context of the Social Problem Solving Model, a well-defined framework of stress and coping, one can begin to better understand how carers can use specific coping skills to manage their stress. This type of information is important in developing and implementing treatment interventions for carers.

Treatment for Carers

There is a large body of research that has investigated psychological distress in many types of family caregivers. These studies have identified several factors that are associated with increased psychological distress in these caregiver populations and have used that information to develop interventions for carers that is aimed at reducing their distress. One such intervention that has been found to be useful for carers includes Problem-Solving Therapy. *Problem-Solving Therapy* (Nezu, Nezu, & D'Zurilla, 2012) is a type of cognitive-behavioral intervention that

helps people improve their problem-solving skills in order to cope more effectively with problematic situations and decrease psychological distress. Problem-Solving Therapy can be used independently or as part of other treatment modalities.

Problem-Solving Therapy has been found to be an effective treatment for improving problem-solving skills and reducing symptomatology in many different types of populations, including individuals with depression (Robinson et al., 2008), anxiety (Provencher, Dugas, & Ladoucher, 2004), diabetes (Toobert et al., 2003), cancer (Nezu, Nezu, Felgoise, McClure, & Houts, 2003), and others. Across many mental and physical health problems, Problem-Solving Therapy has been found to be as effective as other forms of empirically supported treatments, including cognitive behavior therapy (Cape et al., 2010; Malouff, Thorsteinsson, & Schutte, 2007).

Several studies have examined Problem-Solving Therapy specifically in carer populations. It has been demonstrated that Problem-Solving Therapy is an effective treatment for carers who provide care to ill children and adults (Sahler et al., 2002; Wade, Wolfe, Brown, & Pestian, 2005; Berry, Elliott, Grant, Edwards, & Fine, 2012; Rivera, Elliott, Berry, & Grant, 2008). No studies were found that examined Problem-Solving Therapy in ED carers.

Treatment for ED Carers

Historical etiological models of EDs often blamed dynamics in families as the cause of eating pathology. Research does not support the view that families play a causal role in the development of a person's eating disorder (Treasure & Schmidt, 2013). The Academy for Eating Disorders reports that family factors can be involved in influencing the onset and maintenance of EDs, but refutes the notion that family factors are the primary mechanisms involved in the risk of developing an ED (Le Grange, Lock, Loeb, & Nicholls, 2010). The Academy for Eating

Disorders emphasizes the fact that they reject any model of ED etiology that identifies family influences as the primary cause of AN or BN, and warns against using generalizing statements that implicate families as the cause of their child's illness (Le Grange et al., 2010).

Although there is a shift away from blaming families for ED, family members continue to be included often in the ED treatment process. Family involvement appears to be useful in reducing psychological and medical morbidity in individuals with an ED, especially for younger patients (Goddard et al., 2013; Le Grange et al., 2010; Hughes et al., 2014; Eisler, Simic, Russell, & Dare, 2007; Lock, Couturier, & Agras, 2006). It is suggested that families should routinely be involved in the treatment of most young people with an ED, except when it is clinically contraindicated; for example, when there is significant parental psychopathology (Le Grange et al., 2010; Klump et al., 2009).

Exactly how carers and family members should be involved in treatment and how the treatment should be structured to be the most beneficial to the family is expected to vary from family to family (Le Grange et al., 2010; Hughes et al., 2014). There are inconsistent findings regarding the best ways to include carers in treatment, with some suggesting joint family therapy, yet others propose separate treatment interventions. Family-based treatment (FBT), a specific form of family therapy, is the leading treatment for adolescents in the early stages of the eating disorder (Lock & Le Grange, 2015; Lock, Le Grange, Agras, Moye, Bryson, & Jo, 2010). This type of treatment tends to focus on improving emotion regulation and communication about emotions, and aims to help families develop skills in becoming more flexible in behavior and emotionality (Le Grange et al., 2010). FBT has been adapted as the New Maudsley Collaborative Care approach (Treasure, Rhind, Macdonald, & Todd, 2015) to address the needs of families of people in the severe, enduring stage of anorexia nervosa. The intervention addresses both the

needs of the patient and the carer, and expands on the original FBT model to improve carer coping. This intervention addresses coping through providing education, reducing objective and subjective burden, and increasing protecting factors, such as self-care, utilizing social support, and skills in communication and distress tolerance. Many of the skills taught in this program help carers manage their reactions to the illness and effectively manage specific behaviors of the children under their care.

Despite the usefulness of FBT among specific groups of individuals with AN and their families, the approach has certain limitations and it has been proposed that alternative treatment approaches are needed (Hughes et al., 2014). Including carers in empirically supported ED treatments, such as Cognitive-Behavioral Therapy for Eating Disorders (CBT-E; Fairburn, 2008), may prove to be a cost-effective alternative to FBT (Dalle Grave et al., 2013). More recently, it has been suggested that in many instances, carers and patients would benefit from carer treatment that is separate from their child's treatment (Hughes et al., 2014).

In accordance with the factors identified in research as being associated with ED carer distress, ED carer treatments have been developed (Treasure & Nazer, 2016; Slater et al., 2014; Hibbs, Rhind, Leppanen, & Treasure 2015). Across many of the ED carer interventions is the goal of reducing carer psychological distress by decreasing unhelpful cognitive and behavioral reactions to the illness, reducing barriers to adaptive coping, and increasing adaptive coping practices (Grover et al., 2011; Hibbs, Rhind, Leppanen, & Treasure 2015; Treasure & Nazer, 2016).

A better understanding of carer distress and coping can help inform carer treatment, which is particularly relevant now, given the recent suggestion that carers and children may mutually benefit from receiving separate treatment (Hughes et al., 2014). Identifying concrete

cognitive and behavioral variables that influence carer distress, such as those considered in social problem-solving theory, is important for informing carer treatment because these can become targets for change with the use of empirically validated forms of treatment, namely cognitive-behavioral interventions, such as Problem-Solving Therapy and CBT.

Eating disorders affect millions of individuals and families. Parents, particularly mothers, of children with an eating disorder often experience high levels of psychological distress as a result of their caregiving role. Psychological distress in ED carers is associated with increased distress and ED symptoms in their children, so decreasing psychological distress in ED carers is important both for the wellbeing of the parents and of the children under their care. Coping efforts that are effective in managing the stress of being an ED carer have been demonstrated to decrease carers' psychological distress. Although the research suggests the need to manage the demands of being an ED carer via coping efforts, it generally does not address how carers can systematically and successfully do so.

The present study examined stress, coping via social problem solving, and distress in ED carers. The study tested if social problem-solving skills moderate the relationship between stress and distress in ED carers. The study was designed to identify factors that may predict ED carer distress and identify specific cognitive and behavioral targets for change, identified in the Social Problem Solving Model; these could inform ED carer treatments aimed at decreasing ED carers' experienced psychological distress.

IV. Hypotheses

The present study examined the relationship between stress, social problem-solving skills, and psychological distress in mothers of daughters in treatment for Anorexia or Bulimia.

The following hypotheses were tested:

H1) Maternal ED carers' levels of ED-carer-specific stress (as measured by the EDSIS Subscale Scores: Nutrition, Guilt, Dysregulated Behavior, and Social Isolation) will predict carers' levels of psychological distress (as measured by K10 total score), while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score).

H2) Problem Orientation (Positive, Negative) and Problem-Solving Style (Rational Problem Solving, Avoidant, Impulsive/Careless), as measured by the subscales of the SPSI-R:S, will predict psychological distress (K10 Total Score) in maternal ED carers, while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score).

H3) Problem-solving skills (SPSI-R-SF Total Score) will moderate the relationship between eating disorder-specific stress (EDSIS Total Score) and psychological distress (K10 Total Score) in maternal ED carers, while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score).

V. Methodology

Study Design

The current study was a cross-sectional observational design to examine the relationship between social problem-solving skills, stress, and psychological distress in ED carers at a single point in time. These relationships were assessed by having study participants complete measures related to these dimensions of social problem solving, general life stress, ED-carer-specific stress, and psychological distress.

Participants

Participants were women who self-identify as a mother of a daughter with a diagnosis of AN or BN that is currently receiving outpatient treatment for the ED. When predicting psychological distress (K10 Total Score), using five variables (5 subscales of the Social Problem Solving Inventory, Revised-Short Form), for a medium effect size of .15, an $\alpha = .05$, and power = .80, the power analysis suggested the sample size needed for this study was 91 participants. With a large effect size of .35, an $\alpha = .05$, and power = .80, the sample size needed for this study was 43 participants, in order to have statistically significant findings, whether or not a relationship truly exists between stress, social problem-solving efforts, and psychological distress.

Inclusion Criteria

Inclusion criteria required that subjects must be adult females who self-identify as a mother of a daughter with a clinically significant AN or BN diagnosis. The mother must identify her daughter as having a diagnosis of AN or BN; the daughter must currently be in outpatient or intensive outpatient treatment for the eating disorder; the daughter must be between the ages of 10- and 22-years-old, and she must currently live at home with the mother. If the daughter lives

elsewhere part time (e.g., shared custody), that was also acceptable to be included, but the daughter must live at least half of the time with the mother. Mothers of any marital status were able to be included in the study. Mothers in same-sex marriages were eligible to be included. As EDs are often chronic, and stress and coping change over time, the study focused on the caregivers' distress within the first five years of onset in order to avoid capturing the experience of being a chronic caregiver, which is likely a different experience. Mothers whose daughters have previously received treatment for the ED were included, as long as the treatment was during the past two years. Mothers were included if their child is diagnosed with additional disorders (like anxiety, depression). Mothers who have other children living in the home and who have other children with other disorders were also included.

Exclusion Criteria

Exclusion criteria included caregivers other than mothers (guardian, sibling, grandparent, temporary foster parent, other family member). Parents of a son with an ED or parents of a child who identifies as transgender were not included in order to control for the difference in experience that these carers encounter that are not well understood in the ED carer literature. Mothers of daughters with eating disorder diagnoses other than AN and BN (e.g. BED, sub-threshold EDs) or of a daughter younger than 10 or older than 22, were not included in the present study. Additionally, mothers of daughters who are currently in a higher level of treatment for the ED (inpatient hospitalization; feeding tube; partial day program; residential treatment) or who are not receiving treatment were not included.

Recruitment

Participants were recruited online. A brief description of the study and a link to the survey was posted on Twitter, Facebook, and Redditt, and shared with various online support

groups for parents of children with eating disorders. Study information was also disseminated by psychologists and health care professionals who have contact with mothers of daughters with eating disorders. It was advertised that participants would be entered to win one of three \$30 Visa gift cards upon completion of the survey.

Social media sites such as Facebook, Twitter, and Redditt can be accessed through computers, smartphones, and portable communication and entertainment devices. For this reason, and because others have suggested using social media in recruitment efforts (Müller & Stice, 2013; Stice, Rohde, Gau, & Shaw, 2012), recruiting on social media sites was thought likely to draw a diverse and large sample. After reviewing previous research in caregivers of children with an ED and noticing trends in participation, it was predicted that the sample would be predominantly white, and represent individuals from a slightly higher SES than average. Considering that BN occurs more frequently in the population than AN, it was predicted that there would be more carers of a child with BN who participate in the study.

Procedure

Upon contact with the recruitment materials, potential subjects were directed to a website with detailed information about the study. Subjects were asked to consent to participate in a study investigating the experiences of parents of a child with an ED, but were not be given information about the hypotheses or design of the study. Subjects were informed that data would be collected one time. Consent to participation was given by clicking to proceed with the study.

Upon consent, potential subjects were self-screened for inclusion/exclusion criteria via an internet-based survey. Subjects then were led to an online survey that included instruments to measure the variables of interest. The online survey included a demographic questionnaire, and measures of: general life stress [Life Experiences Survey (LES)], ED-carer-specific stress

[Eating Disorders Symptom Impact Scale (EDSIS)]; carers' coping efforts [Social Problem Solving Inventory-Revised: Short Form (SPSI-R:S)]; and carers' psychological distress [The Kessler Psychological Distress Scale (K10)]. At the end of the survey, subjects were provided with mental health resources and prompted to enter the optional raffle to win a \$30 Visa gift card.

Measures

Demographic Questionnaire. Subjects initially completed a brief demographic questionnaire. The information gathered in this measure was used to screen for inclusion and exclusion criteria and to measure factors identified in the ED carer literature as being associated with psychological distress. The demographics questionnaire included information on age, race/ethnicity, marital status, number of children, education level, SES, and current physical and mental health conditions.

Stress. Carers' stress was measured in two domains, general life stress and stress specific to being an ED carer. General life stress was measured in two ways: demographic stress and life experience stress. Demographic stress was measured by specific questions on the demographic questionnaire, and an indication of life experience stress was obtained using the Life Experiences Survey (LES). Stress specifically related to being an ED carer, called *ED-carer-specific stress*, was measured with the Eating Disorders Symptom Impact Scale (EDSIS).

Demographic Stress. Factors identified in the literature as predicting psychological distress in carers were measured by the demographics questionnaire. The four demographic factors included in the present study were selected, based on previous research, and include participants' marital status, levels of education, perceived quality of social support, and presence of mental health diagnoses. To understand subjects' levels of demographic stress in these four

specific domains, subjects reported their relationship status (single, in a relationship, married, divorced), levels of education completed (high school, some college, associate's degree, bachelor's degree, graduate degree), perceived quality of social support (poor or inadequate, adequate, good, excellent), and reported presence of mental health diagnoses. Each of the responses to these four variables were coded according to their relationship to distress, with lower numbers meaning more closely associated with distress and higher numbers less closely associated with distress.

Specifically, the literature has identified "low levels of education" to predict distress, so levels of education were designated as either low (less than a bachelor's degree) or high (a bachelor's or graduate degree), and then coded either as 1 for low or 2 for high. Similarly, poor social support has been associated with distress, and therefore subjects' reported levels of social support was coded from 1 to 4, with 1 indicating poor or inadequate support to 4 indicating excellent social support. Divorce has been associated with distress, and, therefore, participants were coded one if they reported being divorced and two if they did not report being divorced/reported being married. Last, individuals who reported a mental health diagnosis were coded as 1 and those without a diagnosis were coded as a 2. To develop a score of demographic stress, a total score for these four domains was tallied, with possible scores ranging from 4 to 10, and lower scores indicating more demographic stress. The reason that lower scores were chosen to indicate higher level of demographic stress was to be consistent with the measure of life experience stress, which uses lower scores to indicate higher levels of stress.

Life Experiences Survey (LES). The Life Experiences Survey (LES) (Sarason, Johnson & Siegel, 1978) was used to measure participants' levels of stress not specifically related to being an ED carer. The LES, a self-report questionnaire, has 50 items that assess the impact of

significant life events experienced during the previous year (e.g. death of a family member, change in marital status). The measure asks the respondent to report whether or not he or she has experienced each event, then rate the impact of the event on a 7 point Likert-type scale. Respondents rate the impact of the event from an “extremely negative impact” (-3) to an “extremely positive impact” (+3), with 0 indicating neutral impact.

The LES provides a negative change score, a positive change score, and a total change score. The negative change score and positive change score are determined by calculating the sum of the impact ratings of events reported as negative and as positive, respectively. A total change score is derived from the sum of the two change scores. In the current study, only the negative change score was used because this score has been found to be the best predictor of psychopathology (Sarason, Johnson & Siegel, 1978; Smith, Johnson & Sarason, 1978). Higher scores on the negative-change subscale correlate positively with measures of depression and anxiety (Sarason, Johnson & Siegel, 1978). The LES is divided into two sections, the first with 47 life events and three blank spaces for respondents to add other events, and the second with ten items specific to students in academic environments. Only the first section of items was used in the present study. Total possible scores on the LES range from +150 to -150, with lower scores indicating more negative experiences. The LES has been reported to have adequate psychometric properties, including good construct validity (Sarason, Johnson & Siegel, 1978).

The Eating Disorders Symptom Impact Scale (EDSIS). The Eating Disorders Symptom Impact Scale (EDSIS) (Sepulveda, Whitney, Hankin, & Treasure, 2008) was used to measure stress specific to being an ED carer. The EDSIS contains 24 items in four subscales: social isolation, guilt, nutrition, and dysregulated behavior. The *social isolation* and *guilt* subscales measure the degree to which the child’s eating disorder has led carers to experience social

isolation and guilt, respectively. The *nutrition* and *dysregulated behavior* subscales measure the impact of challenges around providing nutrition to their child and the presence of their child's dysregulated behavior, respectively. The measure asks how frequently respondents have engaged in particular thoughts and behaviors during the past month, using a five-point Likert scale ranging from 0 "never" to 4 "almost always." Subscale scores are calculated by tallying responses to the specific items in that domain and then dividing the sum by the number of items on that subscale to provide a mean domain score. Scores on the subscales range from 0 to 4, with higher scores indicating more ED-carer-specific stress. The EDSIS also provides a total score that ranges from 0 to 96, with higher scores indicating more stress, specific to being an ED carer. Total scores are calculated by tallying responses on all items on the measure.

The measure was developed by a team of clinicians, researchers and carers as the first scale to measure the impact that an individual with an ED has on family members. The four subscales were used in the present because it was found that they explained 58.4% of the variance in caregiver distress (Sepulveda, Whitney, Hankin, & Treasure, 2008). The EDSIS demonstrates acceptable reliability with Cronbach's alphas for the subscales ranging from .82 to .89, and total scale reliability coefficient of .90 (Coomber & King, 2012). The EDSIS has been used in ED carer research.

Coping Efforts. Carers' coping skills were measured with the Social Problem Solving Inventory-Revised: Short Form (SPSI-R:S) (D'Zurilla, Nezu, & Maydeu-Olivares, 2002). The SPSI-R:S is a 25-item self-report questionnaire used to assess strengths and weaknesses in one's social problem-solving skills. Items on the SPSI-R:S assess cognitive, behavioral, and emotional responses to real life problem-solving situations, and respondents are asked to rate each item on a 5-point Likert scale ranging from 0 "not at all true of me" to 4 "extremely true of me". The

measure has been used to assess problem-solving skills in a wide variety of populations (Hawkins, Sofronoff, & Sheffield, 2008).

The SPSI-R:S consists of five major scales that correspond to the five-factor theoretical model of social problem-solving (D'Zurilla & Nezu, 2007). The scales include measures of Problem Orientation and Problem Solving Style. Specifically, the measure includes a Positive Problem Orientation (PPO) scale, a Negative Problem Orientation (NPO) scale, a Rational Problem Solving (RPS) scale, an Impulsivity/Carelessness Style (ICS) scale, and an Avoidance Style (AS) scale. Individuals are classified as effective problem solvers if they have high PPO and RPS scores and low NPO, ICS, and AS scores, and as poor problem solvers if they have low PPO and RPS scores and high NPO, ICS, and AS scores (D'Zurilla et al., 2004). The SPSI total score provides a global indicator of social problem-solving ability. Higher scores represent more effective problem solving, and lower scores represent more maladaptive or ineffective problem solving (D'Zurilla, Nezu, & Maydeu-Olivares, 2002). The SPSI-R:S has been shown to have adequate internal consistency ($\alpha = .90$), test-retest reliability ($r = .91$), and convergent validity with other established measures of problem solving (.82) (Hawkins, Sofronoff, & Sheffield, 2008).

Psychological Distress. To measure carers' psychological distress, the Kessler Psychological Distress Scale (K10) (Kessler et al., 2003) was used. The K10 is a questionnaire intended to provide a global measure of distress based on responses to questions about anxiety and depressive symptoms experienced in the most recent four-week period. The K10 consists of 10 questions about non-specific psychological distress. Respondents are asked to rate the frequency of a variety of experiences related to mood and physical symptoms during the last 30 days, using a rating scale from 1 "none of the time" to 5 "all of the time." Total scores range

from 10 to 50, and categorize respondents into one of four categories, “likely to be well,” or likely to have mild, moderate, or severe symptoms of a mental disorder, as measured by level of psychological distress.

The scale strongly discriminates between community cases and non-cases, using diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) for depression and anxiety disorders (Kessler et al., 2003). It was found that the K10 is comparable to the General Health Questionnaire (GHQ-12; Goldberg, 1978; Goldberg & Williams, 1988), a widely used measure of psychological distress (Andrews & Slade, 2001). The K10 is considered a valid and moderately reliable measure of psychological distress—reliability coefficients have ranged from 0.42 to 0.74 (Dal Grande, Taylor, & Wilson, 2002).

Statistical Analysis

Means, standard deviations, score ranges, and norm scores were used to report descriptive information for the measures of life stress (as measured by the LES), ED-carer-specific stress (as measured by the EDSIS), problem solving (as measured by the SPSI-R:S) and psychological distress (as measured by the K10). Descriptive statistics (including means, standard deviations, and frequencies) were utilized to describe the personal characteristics of the sample. Along with this, the following statistical analyses were conducted:

H1) Maternal ED carers’ levels of ED-carer-specific stress (as measured by the EDSIS Subscale Scores: Nutrition, Guilt, Dysregulated Behavior, and Social Isolation) will predict carers’ levels of psychological distress (as measured by K10 total score), while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score).

- A multiple regression was used to assess the relationship between the predictor variables and the outcome variable.

H2) Problem Orientation (Positive, Negative) and Problem-Solving Style (Rational Problem Solving, Avoidant, Impulsive/Careless), as measured by the subscales of the SPSI-R:S, will predict psychological distress (K10 Total Score) in maternal ED carers, while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score).

- A multiple regression was used to assess the relationship between the predictor variables and the outcome variable.

H3) Problem-solving skills (SPSI-R-SF Total Score) will moderate the relationship between eating disorder-specific stress (EDSIS Total Score) and psychological distress (K10 Total Score), while controlling for general life stress (negative change score of the Life Experiences Survey and demographic stress score) in maternal ED carers.

- A moderator analysis was conducted in order to test whether or not social problem-solving skills moderate the relationship between ED-carer-specific stress and psychological distress, after controlling for general life stress.

VI. Results

Participants

To investigate the relationship between social problem-solving skills, stress, and psychological distress in mothers of daughters with eating disorders, a group of volunteer participants were recruited through online social media. The survey was accessed via SurveyMonkey.com. The study was posted online for approximately five months. After closing the study, 88 individuals opened the survey link. Of the 88 respondents, 15 did not meet inclusion criteria, and more than 10% of responses were missing for 20 respondents, so a listwise deletion method was employed. Subsequently, there were 53 participants who met inclusion criteria and completed the study in its entirety. Recruitment was ended before more participants could be included due to the specified timeline within which the study had to be completed. The power analysis suggested the sample size needed for this study was 91 participants for a medium effect size of .15, an $\alpha = .05$, and power = .80, and 43 participants for a large effect size of .35, an $\alpha = .05$, and power = .80. The total number of participants was 53, and a post hoc power analysis revealed a power level of .98.

Descriptive Statistics for Demographic Variables

An analysis of the demographic characteristics was performed only for those individuals who completed the entire study. The sample was entirely female ($N = 53$). The mean age of the sample was 47.89-years-old, with a range of 36- to 61-years-old ($SD = 5.78$). Four participants did not report an age. The mean age of the sample's daughters was 15.75-years-old, with a range of 11- to 22-years-old ($SD = 2.76$). For the income variable, some responses were reported in Pounds (£), so all incomes were converted to US dollars. Additional demographic information about the participants and their daughters is provided in Table 1.

Table 1.

Demographic Information

<u>Educational Attainment</u>	<u>n</u>	<u>Valid Percent</u>
High school diploma or equivalent	2	3.8
Some college	6	11.3
Associate's degree	4	7.5
Bachelor's degree	19	35.8
Graduate degree	22	41.5
 <u>Ethnicity</u>	 <u>n</u>	 <u>Valid Percent</u>
White/Caucasian	51	96.2
Asian	1	1.9
Hispanic	1	1.9
 <u>Household Income</u>	 <u>n</u>	 <u>Valid Percent</u>
Up to \$49,000	2	3.8
\$50,000 - \$99,000	17	32.1
\$100,000 - \$149,999	9	16.9
\$150,000 - \$199,999	7	13.2
\$200,000 - \$249,000	3	5.7
\$250,000 - \$299,999	2	3.8
\$300,000 and above	4	7.5
No reported income	9	16.9
 <u>Employment Status</u>	 <u>n</u>	 <u>Valid Percent</u>
Unemployed	12	22.6
Employed on a part time basis	16	30.2
Employed on a full time basis	25	47.2
 <u>Marital Status</u>	 <u>n</u>	 <u>Valid Percent</u>
Married	46	86.8
Divorced	6	11.3
In a relationship	1	1.9
Single	0	0.0
 <u>Number of Children</u>	 <u>n</u>	 <u>Valid Percent</u>
1	6	11.3
2	23	43.4
3	14	26.4
4	6	11.3
5	3	5.7
6	1	1.9

<u>Number of Children living at Home</u>	<u>n</u>	<u>Valid Percent</u>
1	10	18.9
2	25	47.2
3	12	22.6
4	5	9.4
5	1	1.9

<u>Maternal Mental Health Diagnoses</u>	<u>n</u>	<u>Valid Percent</u>
Depression	14	28.3
Anxiety	10	18.9
Comorbid anxiety/depression	8	15.1
Post Traumatic Stress Disorder	2	3.8
Obsessive Compulsive Disorder	1	1.9
Unspecified Personality Disorder	1	1.9
ADHD	1	1.9
Panic Disorder	1	1.9
Bipolar II Disorder	1	1.9
Autism Spectrum Disorder	1	1.9
Denied	20	37.7

<u>Diagnosed Medical Conditions</u>	<u>n</u>	<u>Valid Percent</u>
Asthma	5	9.4
Autoimmune Disease	3	5.7
Arthritis and other joint problems	2	3.8
Cancer	2	3.8
Gastroenterological Problems	2	3.8
Gynecologic problems	2	3.8
Hypertension	2	3.8
Hypothyroidism	2	3.8
Low Bone Density	1	1.9
Obesity	2	3.8
Hyperlipidemia	1	1.9
Anemia	1	1.9
Epilepsy	1	1.9
Sleep Apnea	1	1.9
Denied	20	37.7

Daughter Information

<u>Eating Disorder Diagnosis</u>	<u>n</u>	<u>Valid Percent</u>
Anorexia	53	100.0
Bulimia	0	0.0

<u>Type of Treatment</u>	<u>n</u>	<u>Valid Percent</u>
Outpatient	45	84.9
Intensive Outpatient	8	15.1

<u>Mental Health Diagnoses</u>	<u>n</u>	<u>Valid Percent</u>
Anxiety	15	28.3
Depression	1	1.9
Comorbid Depression and anxiety	18	33.9
Obsessive Compulsive Disorder	16	30.2
ADHD	3	5.7
PTSD and history of Trauma	4	7.5
Bipolar disorder (unspecified)	1	1.9
ODD	1	1.9
Borderline Personality disorder	1	1.9
Autism spectrum disorder	2	3.8
Learning disability	1	1.9
Denied	30	56.6
<u>Physical Health Diagnoses</u>	<u>n</u>	<u>Valid Percent</u>
Asthma	1	1.9
History of Cancer	1	1.9
Insulin Resistance	1	1.9
Migraines	3	5.7
Growth hormone deficiency	2	3.8
Congenital Heart disease	2	3.8
Thrombophilia	1	1.9
Denied	8	15.1
<u>Daughter History of Self-Harm</u>	<u>n</u>	<u>Valid Percent</u>
Yes	27	50.9
No	25	47.2
Unknown	1	1.9
<u>Daughter History of Suicide Attempt</u>	<u>n</u>	<u>Valid Percent</u>
Yes	11	20.7
No	41	77.4
Unknown	1	1.9

Descriptive Statistics of Administered Measures

Scores for each of the administered measures were calculated. Score ranges, means, and standard deviations for each of the measures administered are presented in Table 2. Life experience stress scores, measured by the negative change scores of the Life Experiences Survey, ranged from -44.00 to 0.00, with lower scores indicating more stress. Scores of demographic stress, measured by four questions on the demographic questionnaire, ranged from

4.00 to 10.00, with lower scores representing more stress. On the measure of psychological distress, measured by the K10 total score, scores ranged from 11 to 41. Total scores on the K10 represent the total amount of psychological distress the individual has experienced in the past 30-day period. To interpret the scores for this measure, scores under 20 suggests that the individual is “likely to be well”; scores ranging from 20 to 24 suggest that the individual is “likely to have a mild mental disorder”; scores from 25 to 29 suggest that the individual is “likely to have a moderate mental disorder”, and scores 30 and above suggest that the individual is “likely to have a severe mental disorder” (Kessler et al, 2003; Andrews & Slade, 2001). Classifications based on total scores on the K10 were calculated for this sample and are presented in Table 3.

On the measure of ED-Carer-specific stress, measured by the EDSIS, total scores ranged from 7 to 69, and subscale scores ranged from 0 to 4. Higher scores indicate higher levels of ED-carer-specific stress. For the measure of problem solving, SPSI-R:S, total and domain-specific scores were calculated and converted into standard scores. To interpret the standard scores for this measure, scores of 55 or lower are within the “Extremely Below Norm Group”; 56-70 are in the “Very Much Below Norm Group Average” range; 71-85 are in the “Below Norm Group Average” range; 86-114 are in the “Norm Group Average” range; 115-129 are in the “Above Norm Group Average” range; 130-144 are in the “Very Much Above Norm Group Average” range, and 145 and above are in the “Extremely Above Norm Group Average” range (D’Zurilla, Nezu, & Maydeu-Olivares., 2002).

Table 2.
Score Ranges, Means, and Standard Deviations for Administered Measures

	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
K10	11	41	24.94	6.86
LES Negative Change Score	-44	0	-12.37	9.94
Demographic Stress	4	10	7.56	1.33
EDSIS Total	7	69	40.98	15.30
Social Isolation Score	0	4	1.87	.94
Guilt Score	0	4	2.11	1.10
Nutrition Score	.5	3.38	1.91	.72
Dysregulated Behavior Score	0	3.0	1.11	.68
SPSI-R:S Total	63	118	93.24	13.24
PPO Score	59	114	88.26	15.14
NPO Score	83	145	108.05	18.33
RPS Score	60	117	88.96	13.03
ICS Score	77	133	95.01	12.40
AS Score	84	134	98.84	11.98

Table 3.
K10 Classifications

	<i>n</i>	<i>Valid Percent</i>
Likely to be well	16	30.2
Likely to have a mild mental disorder	8	15.1
Likely to have moderate mental disorder	14	26.4
Likely to have a severe mental disorder	15	28.3

Hypothesis 1

In order to test whether or not maternal ED carers' and ED-carer-specific stress (measured by EDSIS subscale scores: Social Isolation, Guilt, Nutrition, and Dysregulated Behavior), predict levels of psychological distress (measured by K10 total score), while controlling for general life stress (measured by LES negative change score and demographic stress score), a hierarchical multiple regression was conducted. This analysis allowed the investigator to examine the predictive value of ED-carer-specific stress in relation to

psychological distress while controlling for the potential influences of general life stress. By controlling for these covariates, the potential statistical influence of these variables was accounted for, which may have otherwise affected the dependent variable of psychological distress. Bonferroni correction was used due to testing multiple hypotheses on the same data. This was calculated by dividing the .05 alpha level by the number of hypotheses, resulting in a more stringent alpha criterion of .017.

Before analyzing the hierarchical multiple regression, the relevant assumptions of this statistical test were checked and met. Descriptive data for the measures administered in this hypothesis are presented in Table 2. The correlations among predictor variables were examined and are presented in Table 4. All correlations were weak to moderate, and multicollinearity was unlikely to be a problem because none of the correlations were .8 or above. Homoscedasticity was not violated and tests of skewness and kurtosis found that the variables were largely normally distributed. The assumptions of normality and linearity were met. In Model 1, the VIF value of 1.01 was less than 10, and the tolerance value of .988 was well above .20, which falls within acceptable ranges. In Model 2, the VIF value and tolerance values were also within acceptable ranges for all predictors (Social Isolation = 2.19 and .465; Guilt = 1.63 and .611; Nutrition = 1.97 and .508; and Dysregulated Behavior = 1.57 and .637). Singularity was not violated because no independent variable was found to be a combination of another variable (e.g., subscale scores and the total score of the scale were not included). The assumption for independence of errors was met (Durbin-Watson = 1.964). No significant outliers were identified because all Cook's Distance values were less than 1. Descriptive statistics and correlation coefficients for the measures administered in this hypothesis are presented in Table 4.

Model 1 examined general life stress predicting psychological distress; Model 2 analyzed general life stress plus the domains of ED-carer-specific stress. Results indicated that the model as a whole was significant. When general life stress was entered in Step 1, it predicted psychological distress, $F(2, 50) = 6.19, p < .01$. As indicated by the R^2 of .199, nearly 20% of the variance in psychological distress could be predicted by the participant's level of stress not specific to being an ED carer.

Through data analysis, it was found that ED-carer-specific stress (EDSIS subscale scores: Social Isolation, Guilt, Nutrition, and Dysregulated Behavior) was predictive of psychological distress (K10 total score), while controlling for general life stress (LES negative change score and demographic stress score). When the ED-carer-specific stress was added to the analysis in Step 2, this combination of variables explained a significant proportion of variance in psychological distress scores, $R^2 = .572, F(6, 46) = 10.24, p < .001$. As demonstrated by the R^2 value, this combination of variables accounted for 57% of the variance in level of psychological distress. This indicates that the addition of ED-carer-specific stress was a significant contribution to the model, accounting for an incremental 37% of the variance in overall psychological distress scores above and beyond the variance accounted for by general life stress, ($R^2 \text{ Change} = .37$). Of the four EDSIS subscales, only the Nutrition subscale was found to make a unique significant contribution to the model in predicting psychological distress, $\beta = .404, t(46) = 3.02, p < .001$. The observable effect size attributable to the addition of ED-carer-specific stress in Model 2 is considered to be large ($f^2 = .87$). In summary, these results indicate that ED-carer-specific stress is a significant predictor of psychological distress, while controlling for general life stress, and that of the domains of ED-carer-specific stress, difficulties related to nutrition were significantly predictive of psychological distress. The results are presented in Table 5.

Table 4.

H1 Assessment of Multicollinearity Among EDSIS Subscales

	Correlation Coefficients						
	Psychological Distress	NegLes	Demographic Stress	Social Isolation	Guilt	Nutrition	Dysregulated Behavior
Psychological Distress	1.000						
NegLes	-.297*	1.000					
Demographic Stress	-.363**	.109	1.00				
Social Isolation	.481***	.613***	-.326*	1.000			
Guilt	.574***	-.150	-.120	.410**	1.000		
Nutrition	.684***	-.263	-.254	.524***	.583***	1.000	
Dysregulated Behavior	.482***	-.308*	-.345*	.381**	.416**	.510**	1.000

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5.

H1 Hierarchical Multiple Regression Analysis Summary for ED-carer-specific stress Predicting Psychological Distress, Controlling for General Life Stress

	<i>b</i>	<i>SE B</i>	β	<i>p</i>
Model 1				
Constant	35.71	5.25		
NegLES	-.108	.088	-.260	.046
Demo Stress	-1.71	.654	-.335	.011*
Model 2				
Constant	19.30	5.02		
NegLES	-.055	.087	-.079	.532
Demo Stress	-.958	.539	-.187	.082
SI	.404	1.04	.055	.701
Guilt	1.59	.771	.256	.044
Nutrition	3.88	1.28	.408	.004*
DB	.580	1.22	.057	.637

Note. *b* = Unstandardized B. *SE B* = Coefficients standard error. β = Standardized coefficients

* $p < .017$; ** $p < .001$

Hypothesis 2

In order to test whether or not maternal ED carers' Problem Orientation (PPO, NPO) and Problem-Solving Style (RPS, ICS, AS) predict psychological distress (K10 Total Score), while controlling for general life stress (LES negative change score and demographic stress score), a hierarchical multiple regression was conducted. This analysis allowed the investigator to examine the predictive value of Problem Orientation and Problem-Solving Style in relation to psychological distress while controlling for the potential influences of general life stress, accounting for the potential statistical influence of this variable's effect on the dependent variable of psychological distress. Bonferroni correction was employed, resulting in a more stringent alpha criterion of .017.

Before analyzing the hierarchical multiple regression, the relevant assumptions of this statistical test were checked and met. Homoscedasticity was not violated and tests of skewness and kurtosis found that the variables were largely normally distributed. The assumptions of normality and linearity were met. Descriptive data for the measures administered in this hypothesis can be found in Table 2. Multicollinearity was unlikely to be a problem, because none of the correlations were .8 or above. In Model 1, the VIF value of 1.01 was less than 10, and the tolerance value of .988 was above .20, which falls within acceptable ranges. In Model 2, the VIF value and tolerance values were also within acceptable ranges for all predictors (LES negative change score = 1.14 and .873; Demographic Stress = 1.11 and .894; PPO = 2.18 and .452; NPO = 2.58 and .386; RPS = 1.31 and .764; ICS = 1.26 and .793; AS = 1.75 and .570). Singularity was not violated because no independent variable was found to be a combination of another variable (e.g., subscale scores and the total score of the scale were not included). The assumption for independence of errors was met (Durbin-Watson = 1.758). Homoscedasticity was

not violated and the values of the residuals are normally distributed. No significant outliers were identified because all Cook's Distance values were less than 1. With the exception of one variable (RPS), all predictor variables were significantly correlated with psychological distress, which indicates that the data were suitable for examination through hierarchical multiple regression. The correlations among predictor variables were examined and are presented in Table 6.

Model 1 examined general life stress and demographic stress predicting psychological distress; Model 2 analyzed general life stress and demographic stress plus Problem Orientation and Problem-Solving Style predicting psychological distress. As was reported in Hypothesis 1, it was found that general life stress predicted psychological distress, $F(2, 50) = 6.19, p < .01$. When Problem Orientation and Problem-Solving Style were entered in step 2, it was found that the total variance explained by the model as a whole was 38%, $F(7, 45) = 4.09; p < .01, R^2 = .389$. Together these variables explained an additional 19% of the variance in psychological distress, after controlling for general life stress and demographic stress, which is not a statistically significant finding using the Bonferroni corrected critical value, $F \text{ Change}(5, 45) = 2.80; p = .027$. In the final adjusted model, none of the Problem Orientation or Problem-Solving Style variables were found to make unique significant contributions to the model.

The observable effect size attributable to the addition of Problem Orientation and Problem-Solving Style in Model 2 is considered to be medium ($f^2 = .31$). In summary, these results, presented in Table 7, indicate that Problem Orientation, Problem-Solving Style, general life stress, and demographic stress combined together are significant predictors of psychological distress, although none of the specific Problem Orientations or Problem-Solving Styles were found to be predictors of psychological distress.

Table 6.

H2 Assessment of Multicollinearity Among Problem Solving Predictors

Correlation Coefficients								
	K10	NegLES	Demo Stress	PPO	NPO	RPS	ICS	AS
K10	1.00							
NegLES	-.297*	1.00						
DemoStress	-.363*	.109	1.00					
PPO	-.261*	-.103	.140	1.00				
NPO	.429**	-.128	.002	-.614***	1.00			
RPS	.016	-.219	.053	.355**	-.010	1.00		
ICS	.243*	.009	.173	-.354**	.367**	-.148	1.00	
AS	.350**	.069	.045	-.452**	.626***	-.108	.330*	1.00

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 7.

H2 Hierarchical Multiple Regression Analysis Summary for Problem Solving Orientation and Response Style, Controlling for General Life Stress, Predicting Psychological Distress (N = 54)

	<i>b</i>	<i>SE B</i>	β	<i>p</i>
Model 1				
Constant	34.62	5.65		
NegLES	-.158	.091	-.229	.090
Demo Stress	-1.18	.531	-.295	.030
Model 2				
Constant	8.07	14.68		
NegLES	-.015	.091	-.022	.103
Demo Stress	-1.18	.506	-.279	.032
PPO	.006	.080	.014	.937
NPO	.082	.072	.218	.260
RPS	-.004	.072	-.007	.958
ICS	.065	.074	.117	.385
AS	.109	.091	.190	.240

b = Unstandardized B. *SE B* = Coefficients standard error. β = Standardized coefficients beta.

* $p < .017$; ** $p < .001$

Hypothesis 3

In order to examine if problem-solving skills moderate the relationship between ED-carer-specific stress and psychological distress, a moderation analysis was computed. Bonferroni correction was employed due to testing multiple hypotheses on the same data, resulting in a more stringent alpha criterion of .017. Before analyzing the moderation analysis, the relevant assumptions of this statistical test were checked and met. Descriptive data for administered measures are presented in Table 2. Correlations among predictor variables were examined and are presented in Table 8. Homoscedasticity was not violated and tests of skewness and kurtosis found that the variables were largely, normally distributed. The assumptions of normality and linearity were met. Multicollinearity was unlikely to be a problem because none of the correlations were .8 or above. In Model 1, the VIF value of 1.01 was less than 10, and the tolerance value of .988 was above .20, which falls within acceptable ranges. In Model 2 and Model 3, the VIF value and tolerance values were also within acceptable ranges for all predictors; all VIF values were less than 10 and all tolerance values were well above .20. The assumption for independence of errors was met (Durbin-Watson = 1.86). Homoscedasticity was not violated and the values of the residuals are normally distributed. No significant outliers were identified because all Cook's Distance values were less than 1.

Before this analysis could be conducted, the predictor variables (EDSIS total score and total SPSI total score) were centered. Centering provides a meaningful zero-point for the predictors and moderator. By centering the variables, it was possible to distinguish the effects of the predictor variables from the effects of the moderator. After centering ED-carer-specific stress and psychological distress, the ED-carer-specific stress-by-problem-solving skills interaction term (moderator) was computed.

In the first step, the covariates of general life stress and demographic stress were entered into the model and accounted for nearly 20% of the variance in psychological distress, $F(2, 50) = 6.19, p < .01, R^2 = .199$. In the next step, ED-carer-specific stress and problem-solving skills were entered and were found to explain a significant proportion of variance in psychological distress scores, $F(2, 48) = 15.80, p < .001, R^2 = .568$. This model was statistically significant and accounted for 56% of the variance in psychological distress. The addition of ED-carer-specific stress and problem-solving skills made a significant contribution to the model, accounting for an incremental 37% of the variance in overall psychological distress scores above and beyond the variance accounted for by general life stress and demographic stress (R^2 Change = .370).

In the final step moderator, the interaction between EDSIS and SPSI total scores, was entered into the model. The results indicated that problem-solving skills do not moderate the relationship between ED-carer-specific stress and psychological distress, while controlling for general life stress and demographic stress ($b = .0004, SEb = .003, \beta = .012$). ED-carer-specific stress alone was found to be a statistically significant predictor of psychological distress ($b = .290, SEb = .049, \beta = .647, p < .001$). Results indicated that maternal ED carers who experienced more ED-carer-specific stress were more likely to experience more psychological distress.

Overall, problem-solving skills, ED-carer-specific stress, and the moderator, while controlling for demographic stress and general life stress, was statistically significantly predictive of psychological distress, $F(5, 47) = 12.38, p < .001, R^2 = .569$. However, problem-solving was not found to influence the relationship between ED-carer-specific stress and psychological distress while controlling for general life stress. See table 9 for results of the moderation analysis.

Table 8.

H3 Assessment of Multicollinearity Among Predictors

Correlation Coefficients							
	K10	NegLES	Demo Stress	cEDSIS	cSPSI	Moderator	
K10	1.00						
NegLES	-.297*	1.00					
DemoStress	-.363**	.109	1.00				
cEDSIS	-.723***	-.384**	-.315*	1.00			
cSPSI	.258*	-.026	.092	-.133	1.00		
Moderator	.010	.006	-.111		-.020	.028	1.00

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 9.

H3 Moderation Analysis Results

	<i>b</i>	<i>SEb</i>	β	<i>p</i>
Model 1				
Constant	35.71			
NegLES	-.180			
Demo Stress	-1.71			
Model 2				
Constant	30.19	4.02		
NegLES	-.020	.071	-.029	.778
Demo Stress	-.727	.514	-.142	.164
cEDSIS	.290	.049	.646	.000**
cSPSI	-.082	.050	-.159	.104
Constant	30.14	4.08		
NegLES	-.020	.072	-.029	.781
Demo Stress	-.719	.523	-.140	.176
cEDSIS	-.290	.049	.647	.000**
cSPSI	-.083	.050	-.159	.107
Moderator	.000	.003	.012	.905

* $p < .017$; ** $p < .001$

VII. DISCUSSION

Summary of Findings

The current study investigated the relationship between stress, coping via social problem solving, and psychological distress in mothers of daughters with eating disorders. Overall, the study found ED-carer-specific stress to predict a significant proportion of psychological distress experienced by ED carers, which is congruent with the ED carer literature (Coomber & King, 2013; Padierna et al, 2013). The present study did not find social problem-solving skills as predictive of psychological distress, and was unsuccessful at finding social problem-solving skills as moderating the relationship between stress and psychological distress in ED carers.

The first hypothesis found that the sample of ED carers were highly distressed. Serious psychological distress is defined as the presence of mental health problems severe enough to cause significant impairment in functioning and to require treatment (Pratt, Dey, & Cohen, 2007), and is often measured with the K6 (Kessler et al., 2003) -- the short version of the K10 used in the present study. In the general population, serious psychological distress is thought to affect approximately 3% of the general adult population (Weissman, Pratt, Miller, & Parker, 2015; Clarke, Ward, Schiller, 2016). In the present study, 54% of the sample could be classified as experiencing serious psychological distress. Nearly 70% of the sample reported experiencing psychological distress that can be classified as falling into the mild to severe range (see Table 2). This finding provides further evidence that ED carers are likely to experience high levels of psychological distress and are in need of treatments to help them manage the stress of being an ED carer.

The first hypothesis explored four domains of ED-carer-specific stress in predicting carers' level of psychological distress. These domains reflect the impact of the child's ED on

carers' level of stress in the areas of social isolation, experienced guilt, providing nutrition to their child with the ED, and encountering dysregulated behavior of their child with the ED. It was found that more ED-carer-specific stress predicted higher levels of psychological distress, and of the four domains of this type of stress, difficulties providing nutrition to their child was a unique significant predictor of psychological distress. This was consistent with other ED carer research that found this particular factor to be associated with psychological distress (Martin et al., 2011).

The EDSIS does not classify scores into ranges or levels (e.g., “high” or “low”), so it is challenging to categorize the levels of ED-carer-specific stress experienced by the sample. Since there is no established cut-off score that can be used to describe levels of ED-carer-specific stress, we cannot label the degree of ED-carer-stress experienced by the sample. However, we can compare the present with other samples of ED carers. In the EDSIS development and validation study (Sepulveda et al., 2008), the mean EDSIS total score for the sample of ED carers was 42.8 ($SD = 13.8$). In the present study, the mean EDSIS total score was 40.98 ($SD = 15.30$). The present sample reported similar levels of ED-carer-specific stress, as measured by the EDSIS, as other samples of ED carers. This provides support that the sample in the current study experienced levels of ED-carer-specific stress that are similar to others in the ED carer population.

The second hypothesis explored domains of social problem solving (Problem Orientation and Problem Solving Style) in predicting psychological distress. It was found that none of the social problem-solving domains significantly predicted level of experienced psychological distress. The third hypothesis tested if social problem-solving skills moderate the relationship between ED-carer specific stress and psychological distress. Social problem-solving skills were

not found to moderate the relationship between ED-carer specific stress and psychological distress in this sample of ED carers.

The Sample

A discussion of this study's sample is useful in providing a richer context for interpretation of the findings. Compared with previous ED carer research, the current sample appears to be representative of the ED carer population in some ways, and not representative in others. The sample appears similar to the ED carer population in terms of experienced distress and stress. It has been found that ED carers often experienced high levels of psychological distress, which was found in the present study based on subjects' reported K10 scores. Additionally, levels of ED-carer-specific stress reported by the current sample were similar to other ED carer samples, as measured by the EDSIS. There was no measure that provided an indication of the severity of the child's eating disorder. The sample is likely to represent ED carers of children with relatively similar levels of ED severity because it is thought that females with clinically significant AN or BN experience similar levels of distress and impairment (Dingemans et al., 2016; Stice, Rohde, Durant, & Shaw, 2012). Because the vast majority of individuals with EDs are between 12- and 26-years old, and the average age of participants' daughters was 16, the sample is likely to be representative of the ED carer population as far as the age of the child with the ED. Given that social problem solving has not been studied in ED carers, it is not known if this sample's problem-solving skills are representative of the ED carer population. The mean and median SPSI total scores and subscale scores for the sample fell within the "Norm Group Average" range, indicating that, overall, the sample did not report problem-solving skills that can be classified as below average or above average in the general population.

The sample appears to differ from the ED carer population in terms of demographic and diagnostic factors. The present study represents a sample of ED carers that are almost exclusively White (96%), and all of the subjects reported having daughters with AN diagnoses. Even though EDs are thought to occur about equally among individuals of different ethnic identities and backgrounds, that was not represented in the current sample of ED carers. Additionally, despite the fact that BN is more prevalent than AN in the general population, BN carers are not represented at all in this study.

The sample of ED carers reported household incomes well above national averages. The majority of subjects reported income in US dollars, and some reported income in British Pounds (£), which were converted to US dollars to make the income variable uniform and meaningful. The median income for the sample was \$100,000, and the average was \$134,438. In the United States and the United Kingdom, the median and mean incomes are \$59,039 and £29,300 (\$39,727), respectively. In the United States and the United Kingdom, the mean incomes are \$75,062 and £27,600 (\$37,422), respectively (U.S. Census Bureau. 2016; Office for National Statistics, 2017). For many ED carer studies, income was either not reported or was reported in ways that made comparisons with the present sample challenging. For that reason, it is hard to say if the sample is representative of the ED carer population.

The sample was also highly educated, with 41% of subjects reporting earning a graduate degree, and only 22% reporting earning degrees less than a Bachelor's. Compared with the ED carer research, this sample reported higher levels of education than other samples, and may not be representative of the true level of education in the ED carer population. Although the sample likely differs from the ED carer population in some demographic variables, when it comes to stress and distress, the sample appears to represent ED carers in general.

This description of sample demographics could reflect the idea that individuals with higher education levels and/or high incomes are more likely or capable of accessing the types of support groups that were used to recruit subjects, and are more likely to engage in research. The findings, then, will be understood as most representative of the experience of White AN carers, many of whom are highly educated and of high socioeconomic status. The implications of the lack of sociodemographic and ethnic diversity in the sample are discussed in detail in the limitations section.

Implications of Findings

Overall, this study helps to build on the current understanding of the factors that predict psychological distress in ED carers. Generally, more stress related to the experiences of being an ED carer predicted more psychological distress. It was found that ED carers who report encountering difficulty meeting the nutritional needs of their child experienced higher levels of distress. Of the four domains of ED-carer-specific stress considered in the present study, nutrition difficulties is the only domain that reflects a silent health threat. This means that although social isolation, guilt, and encountering dysregulated behaviors can be quite stressful for carers, having trouble meeting the basic required nutritional needs of one's child might be especially stressful. It is not surprising that this factor was significantly predictive of distress because it directly relates to trouble providing the necessary requirements to keep the child physically well and even alive, which could make carers particularly aware of the potential health risks of the ED.

The present study failed to identify social problem-solving skills as predictive of psychological distress in ED carers. This finding is inconsistent with the general caregiver research, which has found problem-solving skills to predict psychological distress. This finding

is surprising because ED carers are thought to experience similar levels of distress and stress related to the caregiving role as do other familial carers of individuals with serious and chronic mental and physical illnesses. Even though ED carers may experience similar levels of stress and distress as other carers, the findings in the current study do not suggest that social problem-solving skills predict their experiences of psychological distress. It is possible that, compared with other illnesses, eating disorders pose unique and stressful challenges that carers have difficulty managing, despite having adequate problem-solving skills.

The meaning of this null finding is interpreted in the context of the Social Problem-Solving Model and previous research. Many ED carers report lacking practical knowledge about caring for a child with an ED (e.g. Treasure et al., 2007). That is, many carers do not have information about how to address specific problems related to providing physical and emotional support to their children. It is possible that this sample of ED carers might not have the knowledge required for effectively implementing problem-solving skills to manage the problems they encounter as ED carers. This means that even among carers who endorse adaptive problem-solving skills may not have the information needed to develop potential solutions accurately. For example, if a carer is not equipped with helpful ways to meet their child's nutritional needs, then even if they are able to generate several potential solutions and implement them, they might not be effective at solving the problem, leading to ineffective coping efforts and potentially to psychological distress.

There may be barriers that prevent ED carers from effectively coping with ED-carer-specific stress via social problem-solving skills that are related to lack of knowledge about how to manage the problems that arise for ED carers. Without adequate information about effective ways to address problems encountered as ED carers, even carers with adequate problem-solving

skills might have difficulty implementing solutions to these problems. A common need for many ED carers is knowledge about how to manage problems specific to being an ED carer; however, it is likely that the sample in the present study might also lack this practical knowledge. This might help to explain the reason why problem-solving skills were not found to predict psychological distress in the present study. It may also suggest that general problem-solving skills are not enough to manage the ED carer role; there may be specific and unique challenges related to ED symptoms that are not effectively managed with problem-solving skills. This further supports the need to provide practical information to ED carers so they can effectively and appropriately respond to problems they encounter as ED carers. Many ED carer interventions are already aiming to address this need (see Treasure & Nazar, 2016).

It is also important to discuss the distinction between problem-solving skills and solution-implementation skills. These are conceptually distinct concepts and also require a different set of skills. Problem-solving skills involve finding solutions to problems, whereas solution-implementation involves implementing a solution to a problem. Although both sets of skills are important for effectively solving problems, problem-solving skills and solution implementation skills are not necessarily correlated, and a person might have deficits in either or in both areas of problem solving (Nezu, Nezu, & D'Zurilla, 2012). Skills required for effective solution implementation vary across problems, and depend on the type of solution or situation at hand (D'Zurilla, Nezu, & Maydeu-Olivares, 2002). For example, one problem might require the implementation of communication skills and another problem might require the implementation of emotion regulation skills. Although an indication of solution implementation skills is provided in the SPSI total score, specific *types* of solution implementation skills are not measured. Therefore, more information about a person's specific solution implementation skills is required

to make conclusions about a person's adaptive and maladaptive solution implementation efforts (D'Zurilla, Nezu, & Maydeu-Olivares, 2002).

The finding that social problem-solving skills do not influence the relationship between the stress of being an ED carer and the outcome of psychological distress, might be the result of measuring problem-solving skills and not specific solution implementation skills. For example, someone might be quite skilled and effective at implementing problem-solving skills in general, but if the particular skill applied is not effective at solving the problem, then it is not useful. This can also be understood within the context of the ED carer literature that highlights the lack of knowledge about the ED that many carers report. If ED carers are unaware of problems that are thought to be best addressed with problem-focused coping efforts and instead use emotion-focused coping efforts, for example, their efforts to manage stress might be ineffective and lead to the outcome of psychological distress. This is consistent with the transactional stress model (Lazarus & Folkman, 1984), which conceptualizes stress leading to distress when coping efforts are absent or ineffective.

Problem-solving skills are important, but are only one part of effective coping. It is possible that social problem-solving skills in combination with other coping skills and efforts might predict psychological distress. Because the present study examined only coping via social problem solving, one cannot make conclusions about how problem-solving skills *plus* other coping skills might predict distress or influence the relationship between stress and distress. Additionally, the study did not examine Problem Orientation as a potential moderator of the stress-distress relationship. Both the transactional model of stress (Lazarus & Folkman, 1984) and the Social Problem Solving Model (D'Zurilla, Nezu, & Maydeu-Olivares, 2002) emphasize the role of an individual's interpretation of a situation and one's ability to cope with the demands

of the situation in the outcome of stress. In both models, a situation becomes stressful when a person views it as potentially threatening and requiring coping resources that are beyond one's perceived resources. Interpretation of a situation and coping ability can be influenced by one's Problem Orientation. Although individuals with a Positive Problem Orientation tend to view problems as challenges that are solvable, believe in their own ability to cope with problems, and understand negative emotional reactions as a normal part of the problem solving process, people with a Negative Problem Orientation are less optimistic about problems and their problem-solving abilities. They tend to view problems as threatening and unsolvable, doubt their ability to cope with problems, and become frustrated when dealing with problems or negative emotions. Given the important role of one's perception of the situation and available coping abilities, Problem Orientation is important to study in the stress-distress relationship in ED carers. Because Problem Orientation was examined in the present study only in the context of predicting psychological distress and not explicitly examined as a moderator, it is possible that social problem solving was not studied in a way that was able to identify its role, accurately, in predicting psychological distress in ED carers.

Last, the null findings are still potentially useful. Recognizing that the understanding of effective ED carer coping is still not clearly defined or understood, it is helpful to bring awareness to potential coping efforts that are not effective. If there is truly no significant relationship between stress, coping via social problem solving, and psychological distress in ED carers, at least potentially ineffective coping efforts have been identified, moving us closer to a rich understanding of effective coping efforts.

Limitations

A primary limitation of the present study is related to the sample size. The power analysis determined the optimal sample size to be 91 individuals; the present study included 53 subjects, so the study was underpowered. Despite the more stringent Bonferroni corrected alpha criterion in the present study of .017, there is still an increased risk of committing a Type I error because the study was underpowered. Although the present study was underpowered, it is still possible that the null results were found because the sample was not large enough to have statistically significant findings indicating whether or not a relationship truly exists between coping via social problem solving and psychological distress.

Another limitation of the present study involves lack of ethnic diversity of the sample, which influences the ability to generalize the findings to populations who do not identify as White. Given that the prevalence of eating disorders in the United States is thought to be similar among individuals who identify as White, Hispanic, African-American, and Asian, with the exception that AN is slightly more common among Non-Hispanic White individuals, it was predicted that the sample would reflect this diversity. However, the sample was nearly entirely White. The lack of diversity in the present sample could possibly reflect differences in support available to and used by ED carers based on ethnicity and other sociodemographic variables. The sample was largely recruited by advertising in online ED carer support groups. It is possible that ED carers who do not identify as White are not joining or participating in these online support groups, or are unaware of them, which could be limiting their access to social support and resources. Even though EDs are thought to occur about equally among different ethnicities, the sample of the present study suggests that support resources might not be reaching all of these individuals equally.

In the present study, the participants' daughters all had AN diagnoses. We know that AN is thought to occur more frequently in White individuals, so it is not surprising then that the sample had a high percentage of White carers. However, White carers are still overrepresented in the present study. If researchers are not able to access diverse samples of ED carers, it is challenging to understand their experiences and how to help them, and generalization cannot be made about how experiences might be the same or different among ED carers of different ethnic identities and backgrounds. The lack of diversity in carers' ethnicity and daughters' diagnoses limits how much the findings can be generalized to ED carers in general and ED carers of daughter's with BN.

Another limitation relates to the self-report nature of the study. As with all self-report measures, it is necessary to consider potential limitations in subjects' abilities to report their experiences accurately. The ED and other mental health diagnoses reported by subjects were not verified in any way, so it cannot be entirely certain that all carers in the sample are caring for children with relatively similar levels of impairment and illness. The present study used a measure of psychological distress that is not frequently used in the ED carer literature. A widely used measure of psychological distress, the General Health Questionnaire, was not available for use in the present study because the publisher did not grant permission for use internet-based research. Using a measure that is widely used in the ED carer research would have been ideal because more comparisons about levels of psychological distress could be made between the current sample and previously studied ED carers. Another limitation about the measures is the measure of demographic stress because this was created by the authors to derive a metric of demographic stress based on specific questions on the demographic questionnaire. Using a standardized measure would have been ideal, but no measure was found that was appropriate for

the present study. This measure of demographic stress should be interpreted as a crude measure that indicates the presence of particular factors that have been identified in the ED carer literature as contributing to general life stress.

Finally, there are limitations related to the nature of the study examining carers at one point in time. The study did not consider the presence of distress that existed prior to becoming an ED carer. It did not directly assess trait-like factors, such as trait-like depression or anxiety, which likely influence how one experiences and copes with stress. By not measuring these, the results are not able to explain how these factors influence carers' distress. The study did not address the longitudinal experiences of ED carers or how distress in ED carers changes over time. Because EDs are often chronic disorders with typical durations of the illness lasting more than a decade, and the sample included only carers of daughters with an ED onset within the past five years, the findings do not capture the experiences of long-term ED carers. Furthermore, because the present study examined the experiences of ED carers at a single point in time, the researchers did not know how stress, coping, and distress might change over time for ED carers. It has been found that among female familial carers, the stress of the caregiving role can have cumulative effects on health and wellbeing (Caputo, Pavalko, & Hardy, 2016). Many of the studies on ED carers capture the experience of carers within first 5 years of ED onset (see Anastasiadou, Medina-Pradas, Sepulveda, & Treasure, 2014), so even though the present study cannot be generalized to carers of children with ED onset over five years, this limitation does not greatly deviate from the existing ED carer research. Even so, recognizing that EDs are often chronic, it is important to understand how carers react to the stress of being an ED carer over many years.

Future Directions

It is important to draw a more diverse sample in future ED carer research. This could be accomplished by expanding the outreach and advertisement beyond online support groups to treatment programs because the present study found that individuals from these online support groups who participated in the study were primarily White and caring for a child with an AN diagnosis. It could also be useful to study the experiences of ED carers of color specifically. It could be helpful to reach out to treatment providers who serve diverse populations of ED patients, and recruit potential subjects this way. A more in-depth search for online and in-person groups specifically for ED carers of color could identify other groups of ED carers who were not reached in the present study. Additionally, because much of the ED carer research focuses on maternal carers and daughters, there is a need to expand the research to include male carers and male children, and to explore the carer experience in cares and in children who identify as transgender or non-binary.

Although the present study did not find social problem-solving skills to predict psychological distress or moderate the relationship between stress and distress, a relationship between social problem-solving skills and distress in ED carers might truly exist, given the robust findings that support this relationship in other carer research. There could be utility in exploring this potential relationship in ED carers in future research.

At the local level, clinicians who treat ED carers could explore social problem-solving skills of their patients in greater detail. When attempting to help ED carers cope with stress, the SPSI is generally useful in contributing to an understanding of a person's adaptive strengths and deficiencies, and could be used to monitor changes in problem-solving skills over time or as a result of treatment. Also, even though social problem-solving skills were not found to moderate

the relationship between ED-carer-specific stress and psychological distress, these skills could be useful in coping with other general life stress, a factor that was found to predict, significantly, psychological distress in ED-carers. Although social problem-solving skills are important for coping with stress, they are not the only skills required. Clinicians might consider the role of problem solving in the overall fabric of a carer's coping efforts.

Last, the correlation between ED-carer-specific stress and psychological distress is relatively high in the present study, which raises the question if it might be more accurate to examine social problem-solving skills as a mediator rather than as a moderator. Coping efforts are thought to mediate the relationship between stress and distress; therefore, this could be a useful way to explore the role of social problem solving in ED carer distress in the future.

Conclusion

ED carers are at risk for experiencing high levels of stress and psychological distress, which can have negative implications for carers themselves and the children under their care. The findings of the present study emphasize the need to help ED carers manage their stress, and highlight the potentially unique experiences of ED carers when compared with other carer populations. Even ED carers with adequate or good problem-solving skills may be at risk for experiencing psychological distress, suggesting that these skills are not enough to cope with the stress of being an ED carer. Also, some groups of ED carers may be more or less likely to participate in support groups and in research based on sociodemographic factors, suggesting the need to provide resources that reach diverse and potentially underserved populations.

Considering the limitations of the present study, and the strong support for improving social problem-solving skills in other carer populations, it is worth exploring social problem-solving in a larger and more diverse sample of ED carers before concluding that problem-solving

skills are not important means of coping for this carer population. The findings illustrate the need to develop ED carer interventions that improve carers' coping skills, and highlight the challenge in identifying coping efforts that are effective in managing the stress of the ED carer role.

Despite the consistent evidence that ED carers are often distressed, there is hope in the findings that coping helps decrease distress for many of these individuals. As more is learned more about effective and ineffective coping strategies and skills for ED carers, researchers move closer to providing support and treatment to this important carer population.

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